NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS GEOTECHNICAL UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

	SOIL DE	SCRIPTION		GRADATION			TERMS AND DEFINITIONS	ABBREVIATIONS		
I			ATERIALS WHICH CAN BE PENETRATED	WELL GRADED. INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM. INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO				BLDR BOULDER	PL - PLASTIC LIMIT	
WITH A CONTINUOUS FLIGHT POWER				POORLY GRADED)			APPARENT DIP - THE DIP OF ROCK STRATA NOT PERPENDICULAR TO STRIKE.	CL CLAY	PI - PLASTICITY INDEX	
			RIPTIONS GENERALLY SHALL INCLUDE:	GAP-GRADED- INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. ANGULARITY OF GRAINS			AQUIFER - A WATER BEARING FORMATION OR STRATA.	COB COBBLE	n - POROSITY	
			FACTORS, SUCH AS, MINERALOGICAL	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS; ANGULAR,			AUGER REFUSAL (A.R.) - POINT AT WHICH POWER AUGERS WILL NOT PENETRATE.	CSE COARSE	SD SAND	
LIVERS, HIGHLY PLASTIC, A-7-6.	CIURE, PLASITETTY, ETC.	EXAMPLE: VERT STIFF, GRAT SILIT	CLAY, MOIST WITH INTERBEDOED FINE SAND	SUBANGULAR, SUBROUNDED, OR ROUNDED.			BEDDED - SOIL OR ROCK LYING IN A POSITION ESSENTIALLY PARALLEL.	EST ESTIMATED		
1				MINERALOGICAL COMPOSITION			BEDROCK - ROCK OF RELATIVELY GREAT THICKNESS AND EXTENT IN ITS ORIGINAL LOCATION.	F FINE	SAT SATURATED	
		AASHTO CLASSIF	ICATION	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN			CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.	FOSS FOSSILIFEROUS	SL SILT, SILTY	
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS (≤ 35% PASSING •200) (> 35% PASSING •200)					THEY ARE CONSIDERED OF SIGNI		COHESIVE SOIL - A SOIL THAT WHEN UNCONFINED HAS CONSIDERABLE DRY STRENGTH AND	FRAC FRACTURED	SLI SLIGHTLY	
GROUP A-1 A-3			A-1, A-2 A-4, A-5	COMPRESSIBILITY			SIGNIFICANT COHESION WHEN SUBMERGED.	GR GRAVEL	G _S - SPECIFIC GRAVITY	
1 0.100,	A-2-4A-2-5A-2-6A-2		A-3 A-6, A-7	SLIGHTLY COMPRESSIBLE	CONTRESSIBILITY	LIQUID LIMIT LESS THAN 30	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.	LL - LIQUID LIMIT	qu - UNCONFINED COMPRESSIVE STRENGTH	
SYMBOL 000000000000000000000000000000000000				MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50			CORE RECOVERY (% REC.) - TOTAL LENGTH OF ALL ROCK DIVIDED BY TOTAL LENGTH OF CORE	MED MEDIUM	7 - UNIT WEIGHT (WET UNIT WEIGHT)	
5555555555				HIGHLY COMPRESSIBLE	DOCK DECEDIBIION	LIQUID LIMIT GREATER THAN 50	RUN AND EXPRESSED AS A PERCENTAGE.	W - MOISTURE CONTENT	$\gamma_{\sf d}$ - DRY UNIT WEIGHT	
% PASSING • 10 50 MX			GRANULAR SILT- MUCK.	THE SPONGEST MEANING	ROCK DESCRIPTION		COULINA - A ROCK TYPE COMPOSED ESSENTIALLY OF MARINE SHELLS CEMENTED BY CALCIUM CARBONATE.	MOT MOTTLED	7SAT - SATURATED UNIT WEIGHT	
- 40 30 MX50 MX51 MN				NG, HARD ROCK IS CONSIDERED TO AL SOIL SAMPLING TOOLS OR TEC	HAI MAIERIAL WHICH CANNOT BE HNIQUES. THE BOUNDARY BETWEEN	DIKE - IGNEOUS ROCK INTRUSION WHICH IS NARROW COMPARED WITH ITS OTHER DIMENSIONS.	OM - OPTIMUM MOISTURE	e - VOID RATIO		
• 200 15 MX 25 MX 10 M	MX 35 MX 35 MX 35 MX 35	MX 36 MN 36 MN 36 MN 36 M	N SOILS	SOIL AND ROCK IS ARBITRARY. TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED			<u>DIP</u> - THE ANGLE BETWEEN A BEDDING PLANE, JOINT PLANE OR FAULT PLANE AND THE HORIZONTAL, MEASURED PERPENDICULAR TO THE STRIKE.	ORG ORGANIC	V VERY	
LIQUID LIMIT		MN 40 MX 41 MN 40 MX 41 M		BY A ZONE OF 'WEATHERED ROCK'. FOR THE PURPOSE OF THIS INVESTIGATION, THESE			DUMPS - UNCOVERED DEPOSITS OF WASTE MATERIAL SUCH AS WOOD, MASONRY DEBRIS OR GARBAGE.			
PLASTIC INDEX 6 MX N.P.	P- 10 MX 10 MX 11 MN11	MN 10 MX 10 MX 11 MN 11 M	LITTLE OR HIGHLY	MATERIALS ARE DIVIDED AS FOLLOWS:			FAULT - A BREAK IN THE CONTINUITY OF A BODY OF ROCK, ATTENDED BY A MOVEMENT ON			
GROUP INDEX Ø Ø	0 4 MX	8 MX 12 MX 16 MX NO M	MODERATE ORGANIC	SOFT MATERIAL THAT CAN BE PENETRATED WITH SOME WEATHERED DIFFICIL TY USING POWER AUGERS AND YIFI DS				CAUTION NOTICE :		
USUAL TYPES STONE FRAGS. STITY OR CLAYEY STITY CLAYEY ORGANIC			BOCK PROCESS OF THE P			FINES - PORTIONS OF A SOIL FINER THAN NO. 200 U.S. STANDARD SIEVE.	CAUTION NOTICE:			
OF MAJOR GRAVEL AND SAND			MATTER	(SWR) HARD MATERIAL THAT CAN BE PENETRATED WITH GREAT			FISSILITY OR FISSILE - A PROPERTY OF SPLITTING EASILY ALONG CLOSELY SPACED PARALLEL	THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS MADE		
GEN. RATING				(UMD) HATCHE THE CHIN BE PENETRHIED WITH OREH			FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED	FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. SOME DATA OBTAINED MAY BE OMITTED FROM THIS RELEASE.		
AS A EXCELLE	ENT TO GOOD	FAIR TO POOR	FAIR TO POOR UNSUITABLE	ROCK SPT REFUSAL."			FROM PARENT MATERIAL.			
SUBGRADE				HARD CORED ROCK INFERRED ROCK MATERIAL THAT CANNOT BE PENETRATED BY POWER AUGERS, EXCEPT IN THIN LEDGES, AND REQUIRES			R FLOODPLAIN - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.	ADDITIONAL INFORMATION MAY BE AVAILABLE, IN	CLUDING, BUT NOT LIMITED TO THE FOLLOWING:	
P.I. OF A		0 : P.I. OF A-7-5 >					FORMATION - A MAPPABLE UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.	FIELD BORIN	G LOGS	
		CY OR DENSENES I RANGE OF STANDARD	RANGE OF UNCONFINED	" SPT REFUSAL ≤ 1 INCH OF PENETRATION PER 50 BLOWS.			FRACTURE - A CRACK LARGE ENOUGH TO BE VISIBLE TO THE UNAIDED EYE.	ROCK CO		
PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	PENETRATION RESISTENCE	COMPRESSIVE STRENGTH	** AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH AUGERS COULD NO LONGER		ICH AUGERS COULD NO LONGER	FRIABLE - EASY TO BREAK OR CRUMBLE.	SOIL & ROCK TEST DATA Subsurface report		
	·	(BLOWS)	(TONS/FT 2)			OCK IS CORED AND ONLY TO THAT	GRANULAR MATERIAL - SOIL THAT WHEN UNCONFINED HAS LITTLE OR NO DRY STRENGTH AND HAS	THE DESCRIPTION MAY BE WELLED BY ADDONA		
GENERALLY	VERY LOOSE LOOSE	<4 4 TO 10		DEFINITION OF ROCK 13 DIVEN INCCODENCE			LITTLE OR NO COHESION WHEN SUBMERGED.	THIS INFORMATION MAY BE VIEWED BY APPOINTMENT BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND I		
GRANULAR	MEDIUM DENSE	10 TO 30	N/A	BY THE TOTAL LENGTH OF ROCK RECOVERED IN THE CORE BARREL DIVIDED			OF GROUNDWATER (G.W.) - WATER THAT IS FREE TO MOVE THROUGH SOIL MASS UNDER THE INFLUENCE OF GRAVITY.	NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS PART OF THE CONTRACT.		
MATERIAL	DENSE	30 TO 50		BUCK OHALITY DESIG			GROUNDWATER LEVEL - LEVEL OF WATER WITH RESPECT TO EXISTING GROUND SURFACE.	GENERAL SOIL AND ROCK STRATA DESCRIPTIONS	C AND INDICATED BOUNDADIES ADE BASED ON A	
	VERY DENSE	>50		THAT ARE LONGER THAN OR EQUAL TO 4° DIVIDED			HARDPAN - A GENERAL TERM USED TO DESCRIBE A HARD CEMENTED SOIL LAYER WHICH DOES		BLE SUBSURFACE DATA AND MAY NOT NECESSARILY	
	VERY SOFT SOFT	<2 2 TO 4	<0.25 0.25 TO 0.5 0.5 TO I	BY THE TOTAL LENGTH OF THE CORE RUN TIMES 100%. GROUND WATER WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING. STATIC WATER LEVEL AFTER 24 HOURS.			NOT SOFTEN WHEN WET.		BETWEEN BORINGS OR BETWEEN SAMPLED STRATA	
GENERALLY SILT-CLAY	MEDIUM STIFF	4 TO 8					INDURATED - EARTH MATERIAL HARDENED BY HEAT, PRESSURE OR CEMENTATION.	WITHIN THE BOREHOLE, THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CA RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATION, THESE WATER LEVELS OR MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INC		
MATERIAL	STIFF VERY STIFF	8 TO 15 15 TO 30	I TO 2				INTERBEDDED - ALTERNATING LENSES OR LAYERS OF SOIL AND/OR ROCK MATERIALS.			
	HARD	>30	2 TO 4				JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.			
	TEXTURE	OR GRAIN SIZE		PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA			LAMINATED - VERY THIN ALTERNATING LAYERS LESS THAN LINCH.	TEMPERATURES, PRECIPITATION AND WIND, AS Y	ELL AS OTHER NON-CLIMATIC FACTORS.	
				0000			LAYER - SUBJECT MATERIAL GREATER THAN LINCH IN THICKNESS.	THE RIDDER OR CONTRACTOR IS CAUTIONED TH	AT DETAILS SHOWN ON THE SUBSUDEACE DI ANS	
U.S. STD. SIEVE SIZE OPENING (MM)	4 10 4.76 2.0	40 60 20 0 0.42 0.25 0.0		OM► SPRING OR SEEPAGE			LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.	THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT, FOR BIDDING		
O' ENTITO (TITY)	7.70 2.0		75 6.655	MISCE	LLANEOUS SYMBOLS AND) ABBREVIATIONS	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.		CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY	
BOULDER COBBLE	E GRAVEL	COARSE FINE		ROADWAY EMBA	SPT	SAMPLE	·		NT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR THE INTERPRETATIONS MADE OR OPINIONS OF THE	
		SAND SAND	,	WITH SOIL DE		EST BORING DESIGNATIONS	MARL - A NON-INDURATED, CALCAREOUS DEPOSIT OF CLAYS, SILTS AND SANDS, OFTEN CONTAINING SHELLS.	DEPARTMENT AS TO THE TYPE OF MATERIALS	AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR	
GRAIN MM 305	75 2.0	0.25	0.05 0.005] "\"	A	S- BULK SAMPLE	MICACEOUS SOIL (MIC.) - A SOIL OR ROCK TYPE CONTAINING AN APPRECIABLE AMOUNT OF MICA.	CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS		
SIZE IN. 12" 3"				SS- SPLIT SPOON ARTIFICIAL FILL OTHER THAN				NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME		
SOIL MOISTURE - CORRELATION OF TERMS							MUCK (MK.) - A HIGHLY ORGANIC SOIL OF VERY SOFT CONSISTENCY, GENERALLY FOUND ON	ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM		
SOIL MOISTURE SCAL		40 LETURE	FIELD MOISTURE DESCRIPTION	T ROADWAY EMBANKMENTS TO CORE BURING			TIDAL FLATS, LAKE OR STREAM FLOODPLAINS. PEAT (PT) - A FIBROUS MASS OF ORGANIC MATTER IN VARIOUS STAGES OF DECOMPOSITION.	THOSE INDICATED IN THE SUBSURFACE INFORMATION.		
(ATTERBERG LIMITS)	DESCRI	IPTION GOIDE FOR	TELD HOISTONE DESCRIPTION	MONITORING WELL SAMPLE			PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE	NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTME	S NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT	
	- SATUR	RATED - USUALLY	LIQUID: VERY WET, USUALLY	1	L BOONDHATES	RS- ROCK SAMPLE	OF AN INTERVENING IMPERVIOUS STRATUM,	OF TRANSPORTATION AS BEING ACCURATE NOR		
	(SA		OW THE GROUND WATER TABLE	ALLUVIAL/RES	۸ ۰۰	EZOMETER ISTALLATION	RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.	SPECIFICATIONS, OR CONTRACT FOR THE PROJECT	г.	
PLASTIC LIQUID LIM	IMIT			250			ROCK - SEE LEGEND		ON THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS	
RANGE <	- WET		D; REQUIRES DRYING TO OPTIMUM MOISTURE	DIP DIRECTION AND		OPE INDICATOR ●- SOUNDING ROD STALLATION	ROCK QUALITY DESIGNATION (R.O.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL	FOR INCREASED COMPENSATION OR EXTENSION CONDITIONS INDICATED HEREIN AND THE ACTUA		
(PI)	TMIT	HITHIN C	OFFITMOM MOISTORE	<u> </u>		STALLATION	LENGTH OF CORE RUN EXPRESSED AS A PERCENTAGE.	CONDITIONS INDICATED HEREIN AND THE ACTOR	L CONDITIONS AT THE PROJECT SITE.	
				APPARENT DIF		PT N-COUNT	SANITARY LANDFILLS - COMPACTED AND/OR COVERED LAYERS OF SOIL AND WASTE PRODUCTS.			
OM _ OPTIMUM MO		T - (M) SOLID; A	AT OR NEAR OPTIMUM MOISTURE				SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF	NOTES:	4.3	
SL _ SHRINKAGE	LIMIT				PMENT USED ON SUBJEC		THE PARENT ROCK.			
	- DRY		S ADDITIONAL WATER TO OPTIMUM MOISTURE	DRILL UNITS:	AUGER TOOLS:	HAMMER TYPE:	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLAIN.			
			OF TIMOM MUISTORE	MOBILE B	6 INCH CONTINUOUS FLIGHT	X AUTOMATIC MANUAL	SILL - AN IGNEOUS SHEET OF INTRUSIVE ROCK WHOSE THICKNESS IS SLIGHT COMPARED TO			
PLASTICITY PLASTICITY INDEX DRY STRENGTH			DDV 0705107:		8 INCH HOLLOW AUGERS	CORE PORTNE TOOLS	TTS LATERAL EXTENT.			
	PLAST	ICIIT INDEX	DRY STRENGTH	BK-51	l	CORE BORING TOOLS:	SOME - PRESENCE OF 5% TO 30% OF SUBJECT MATERIAL.			
NONPLASTIC		-5	VERY LOW	CME-45	HARD FACED FINGER BITS	SAXBXNX	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR B.P.F.) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF I FOOT INTO SOIL WITH			
LOW PLASTICITY MED. PLASTICITY		- 15 - 25	SLIGHT MEDIUM	X CME-550	TUNG CARBIDE INSERT	HAND TOOLS:	A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL PENETRATION RESISTANCE OF LESS			
HIGH PLASTICITY		OR MORE	HIGH	1 =	1=	POST HOLE DIGGER	THAN INCH WITH 50 BLOWS.			
	C	OLOR		PORTABLE HOIST	CLAY BITS	} 	STRIKE - THE DIRECTION OR BEARING OF A HORIZONTAL LINE IN THE PLANE OF AN INCLINED STRATUM, JOINT, FAULT OR OTHER STRUCTURAL PLANE.			
DESCRIPTIONS MAY THOUS			DED VEL-DOW DUIL COMM		OTHER:	HAND AUGER	SUBGRADE - THE SOIL PREPARED TO SUPPORT A STRUCTURE OR A PAVEMENT SYSTEM.			
1			RED, YEL-BRN, BLUE-GRAY)			SOUNDING ROD	TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.			
MODIFIERS SUCH AS LIGHT, DARK, MOTTLED, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE				OTHER		X VANE SHEAR TEST	TRACE - PRESENCE OF LESS THAN 5% OF SUBJECT MATERIAL.		REVISED AUGUST 10, 1998	
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